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Dysphania congestiflora (Chenopodiaceae), a new species from Western Australia

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Abstract

Dillon, S.J. & Markey, A.S. *Dysphania congestiflora* (Chenopodiaceae), a new species from Western Australia. *Nuytsia* 27: 133–138 (2016). A new species of *Dysphania* R.Br., *D. congestiflora* S.J.Dillon & A.S.Markey is described and an amendment to the most recent key of *Dysphania* is provided to include the new taxon.

Introduction

In Australia *Dysphania* R.Br. comprises 22 taxa (including infraspecies) (Council of Heads of Australasian Herbaria 2006–), of which 19 are found in Western Australia (Western Australian Herbarium 1998–). Ten of the 22 Australian (both native and introduced) taxa in *Dysphania* were recently transferred from *Chenopodium* L. (Mosyakin & Clemants 2002, 2008; Shepherd & Wilson 2008, 2009). Molecular phylogenetic studies generally support this decision (Kadereit *et al.* 2010; Fuentes-Bazan *et al.* 2012). Since then, several new species of the re-circumscribed *Dysphania* have been described from Asia (Sukhorukov 2012; Uotila 2013; Sukhorukov *et al.* 2015); however, no new Australian species have been described since a taxonomic revision of the tribe Chenopodieae Dumort. by Wilson (1983). During a recent (2013–2014) Department of Parks and Wildlife floristic survey of the Fortescue Marsh landform in the Pilbara region, a morphologically distinct and previously undescribed species was found and is described herein as *D. congestiflora* S.J.Dillon & A.S.Markey.

Methods

Descriptions were compiled using dried herbarium specimens held at the Western Australian Herbarium (PERTH), material cultivated at the Department of Parks and Wildlife, and field observations. Plants were grown from seed obtained from field collections from the Fortescue Marsh and grown in heavy saline clay soils that had been sampled from sites on the marsh where *D. congestiflora* had been recorded. Seed germination was only possible after the seed coat had been nicked with a scalpel.

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Amendment to the key to *Dysphania* species in Shepherd & Wilson (2008)

3: Flowers in spike-like inflorescences

9. Seed compressed-globular; embryo oblique to erect ..... **D. sphaerosperma**

9: Seed ellipsoidal or broadly pear-shaped, erect; embryo lateral and basal

10. Tepals free, rounded or inconspicuously keeled on back

10A. Style solitary, pericarp faintly areolate otherwise smooth ..... **D. plantaginella**

10A: Styles 2, pericarp covered with prominent gland-like papillae ..... **D. congestiflora**

10: Tepals united into a hard cup-shaped tube in lower half, prominently and horizontally keeled ..... **D. simulans**

Taxonomy

Dysphania congestiflora S.J.Dillon & A.S.Markey, *sp. nov.*

Type: on western margin of Fortescue Marsh, Western Australia [precise locality withheld for conservation reasons], 31 July 2015, *M.N. Lyons & S.D. Lyons* 5222 (*holo*: PERTH 08730105).

Dysphania sp. Fortescue Marsh (A. Markey & S. Dillon FM 9709), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 22 March 2016].

Annual *herb* with erect main stems, 3–9(–10) cm high. *Stems* unbranched or with 2–7 branches, branching 15–34 mm above the ground, covered with a sparse to moderate indumentum of short, gland-tipped hairs 0.05–1.0 mm long and scattered short, septate, simple hairs 0.075–1.5 mm long. *Leaves* shortly petiolate; *petioles* indistinct 0.5–1.0(–1.5) mm long; *lamina* slightly fleshy, narrowly obovate to obovate, 4.5–13 mm long, 1.2–2.6 mm wide, apex obtuse, base attenuate, margin entire to irregularly lobed; with a sparse to moderate indumentum of short, gland-tipped hairs and scattered short, septate, simple hairs, indumentum less dense distally. *Inflorescence* terminal, sessile or with peduncles to 0.6(–1.5) mm long, narrowly cylindrical, erect spikes 1.0–1.6 mm wide, composed of densely crowded glomerules; *bracts* (beneath each glomerule) glabrous or with scattered sessile glands, 0.5–0.75 mm long in fruit; *limb* cucullate, slightly inflated, apex long-acuminate 0.2–0.375 mm long; *claw* slender, 0.15–0.2 mm long. *Flowers* sessile. *Terminal flower* (of glomerule) bisexual; *tepals* 3, free, 0.5(–0.6) mm long in fruit, glabrous or with scattered sessile glands; *limb* cucullate, slightly inflated, increasingly so with age; *claw* slender, linear; *stamen* solitary, filament flat, 0.7–0.75 mm long, 0.1 mm wide, anther 0.175–0.225 mm long; *styles* 2, apical, linear, slender, 0.25–0.5 mm long. *Lateral flowers* (of glomerule) female; *tepals* 1, similar to terminal flower. *Pericarp* diaphanous, covered with prominent gland-like papillae. *Seed* erect, elliptic to obovate, terete to slightly laterally compressed in TS, not flattened on the side bearing the embryo-groove, (0.3–)0.35–0.375 mm long, 0.16–0.2 mm wide, apex rounded; *embryo-groove* longitudinal from base to *c.* 3/4 of the way to the seed apex; *embryo* lateral from base to *c.* 3/4 of the way to the seed apex, erect, radicle inferior. *Infructescence* breaking apart into separate tepals and fruits at maturity. (Figures 1, 2D, 3D)

Diagnostic features. *Dysphania congestiflora* differs from other members of the genus by the following combination of characters: annual herb; entire to lobed leaves; terminal, narrowly cylindrical inflorescences composed of densely crowded glomerules; sessile flowers; 2 styles; pericarps with gland-like papillae; longitudinal embryo-groove from base to *c.* 3/4 of the way to the seed apex.

Figure 1. *Dysphania congestiflora*. Image from *S. Dillon* 6999. Photograph by S. Dillon.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 22 July 2015, *S. Dillon* 6999 (PERTH); 2 June 1961, *A.S. George* 2514 (PERTH); 14 June 2014, *A. Markey & S. Dillon* FM 9707 (PERTH); 22 June 2014, *A. Markey & S. Dillon* FM 9708 (PERTH); 16 June 2014, *A. Markey & S. Dillon* FM 9709 (PERTH).

Phenology. A short-lived annual that has been found flowering and fruiting from early to late winter (June to August) following favourable late summer rainfall events that inundate the Fortescue Marsh.

Distribution and habitat. *Dysphania congestiflora* has been recorded from the western side of Fortescue Marsh from flats on the margin and towards the centre of seasonally inundated flood plains and lake beds, on saline, deep, light-medium to heavy clay soils (Figure 4). A single collection has also been recorded from the Lyndon River in close proximity to Lake Macleod.

Conservation status. Recently listed as Priority Three under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, as *Dysphania* sp. Fortescue Marsh (A. Markey & S. Dillon FM 9709) (Western Australian Herbarium 1998–).

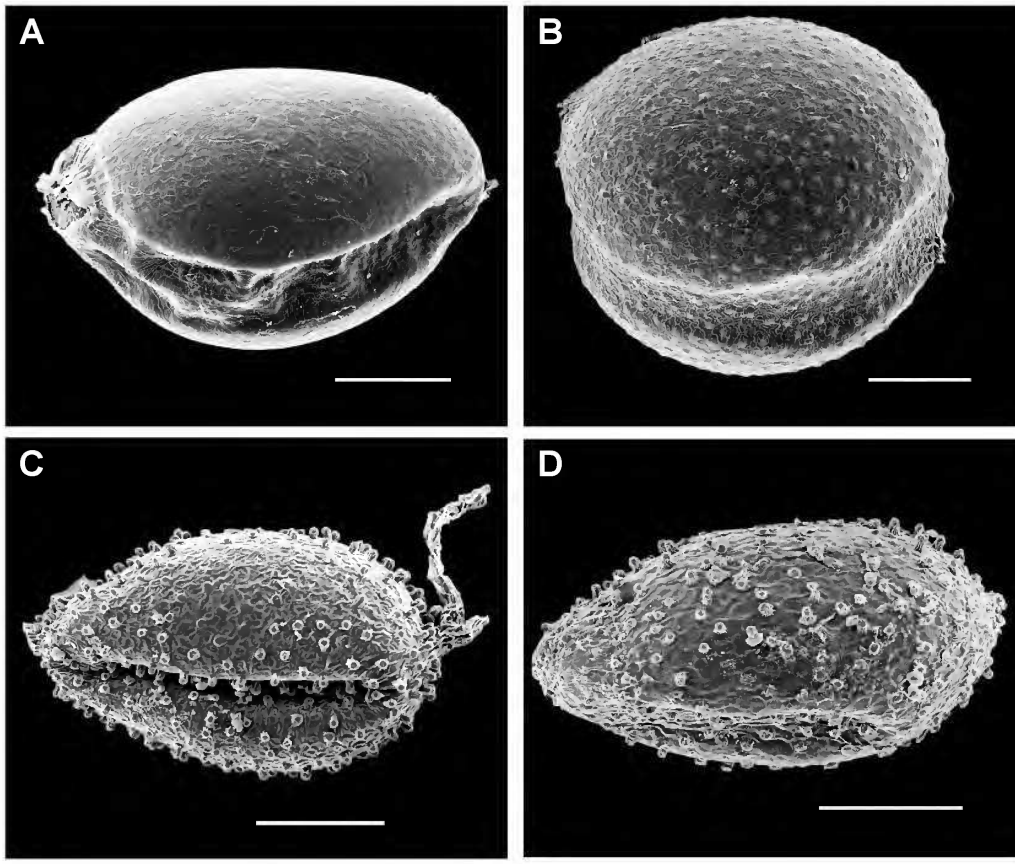

Figure 2. Fruits. A – *Dysphania plantaginella*, B – *D. sphaerosperma*, C – *D. glandulosa*, D – *D. congestiflora*. Scale bars = 100 µm. Images from *M.N. Lyons & S.D. Lyons* 5207 (A), *D.E. Albrecht* 11237 (B), *A. Burbidge* E74a (C) and *A. Markey & S. Dillon* FM 9708 (D). Photographs by S. Dillon.

Etymology. The epithet is from the Latin *congestus* (crowded together) and *flores* (flowers), and refers to the densely packed inflorescence glomerules.

Affinities. *Dysphania* species with similar terminal inflorescences and tepals are *D. plantaginella* F.Muell. and *D. sphaerosperma* Paul G.Wilson. *Dysphania plantaginella* differs from *D. congestiflora* in having entire leaves, flowers with a slender pedicel, tepals free but remaining attached to the pedicel, a single style, the pedicel, tepals and fruit falling as a unit, a faintly areolate to smooth pericarp, and larger seeds (0.4–0.45 mm long) that are flattened on the side of the embryo-groove, with the embryo-groove and embryo extending from the base to the apex of the seed (Figures 2A, 3A). *Dysphania sphaerosperma* differs from *D. congestiflora* in having entire to undulate leaf margins, pedicellate flowers, a single style, a minutely granulate papillose pericarp, and compressed-globular seeds that are larger (0.5 mm) with a semi-circular embryo (Figures 2B, 3B).

The fruits of *D. glandulosa* Paul G.Wilson are most similar to those of *D. congestiflora* in having prominent gland-like papillae but *D. glandulosa* differs in having a prostrate habit, entire leaves with petioles as long as the elliptic lamina, axillary inflorescences, two short styles that are offset from the fruit apex, seed that is flattened on the side bearing the embryo-groove, and an embryo-groove and embryo that extend from the base to the apex of the seed (Figures 2C, 3C).

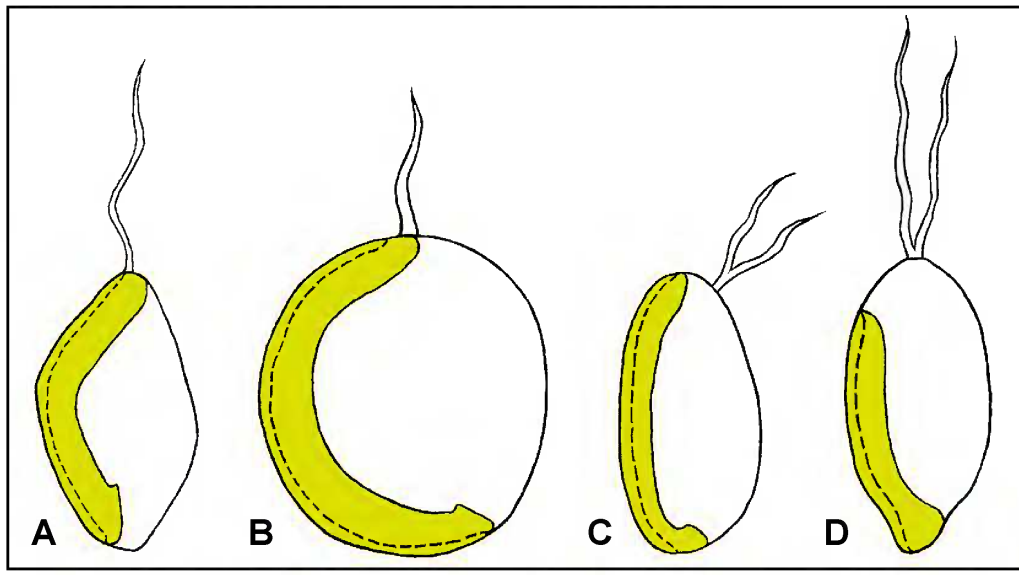

Figure 3. Embryo (coloured portion) position within the seed and the embryo-groove (dashed line). A – *Dysphania plantaginella*, B – *D. sphaerosperma*, C – *D. glandulosa*, D – *D. congestiflora*. Images from *M.N. Lyons & S.D. Lyons* 5207 (A), *D.E. Albrecht* 11237 (B), *A. Burbidge* E74a (C) and *A. Markey & S. Dillon* FM 9708 (D). Diagrams by S. Dillon.

Figure 4. Typical habitat of *Dysphania congestiflora* at Fortescue Marsh. Photograph by S. Dillon.

The suggested vernacular name is Marsh Crumbweed.

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References

Council of Heads of Australasian Herbaria (2006–). *Australian Plant Name Index–APNI*. http://www.anbg.gov.au/apni/ [accessed 29 April 2016].

Fuentes-Bazan, S., Uotila, P. & Borsch, T. (2012). A novel phylogeny-based generic classification for *Chenopodium* sensu lato, and a tribal rearrangement of Chenopodioideae (Chenopodiaceae). *Willdenowia* 42: 5–24.

Kadereit, G., Mavrodie, E.V., Zacharias, E.H. & Sukhorukov, A.P. (2010). Molecular phylogeny of Atripliceae (Chenopodioideae, Chenopodiaceae): implications for systematics, biogeography, flower and fruit evolution, and the origin of C_4 photosynthesis. *American Journal of Botany* 97(10): 1664–1687.

Mosyakin, S.L. & Clemants, S.E. (2002). New nomenclatural combinations in *Dysphania* R.Br. (Chenopodiaceae): taxa occurring in North America. *Ukrayin'kyi Botanichnyi Zhurnal* 59: 380–385.

Mosyakin, S.L. & Clemants, S.E. (2008). Further transfers of glandular-pubescent species from *Chenopodium* subg. *Ambrosia* to *Dysphania* (Chenopodiaceae). *Journal of the Botanical Research Institute of Texas* 2(1): 425–431.

Shepherd, K.A. & Wilson, P.G. (2008). New combinations in *Dysphania* (Chenopodiaceae). *Nuytsia* 18: 267–272.

Shepherd, K.A. & Wilson, P.G. (2009). Clarification of recent combinations in the genus *Dysphania* (Chenopodiaceae). *Nuytsia* 19: 198–199.

Sukhorukov, A.P. (2012). Taxonomic notes on *Dysphania* and *Atriplex* (Chenopodiaceae). *Willdenowia* 42: 169–180.

Sukhorukov, A.P., Zhang, M.-L. & Kushunina, M. (2015). A new species of *Dysphania* (Chenopodioideae, Chenopodiaceae) from South-West Tibet and East Himalaya. *Phytotaxa* 203(2): 138–146.

Uotila, P. (2013). *Dysphania* sect. *Botryodes* (Amaranthaceae s.lat.) in Asia. *Willdenowia* 43: 65–80.

Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Parks and Wildlife. https://florabase.dpaw.wa.gov.au/ [accessed 29 April 2016].

Wilson, P.G. (1983). A taxonomic revision of the tribe Chenopodieae (Chenopodiaceae) in Australia. *Nuytsia* 4(2): 135–262.